

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KARL C. KHARAS, MICHAEL G. HENK and HEINZ J. ROBOTA

Appeal No. 95-4932
Application No. 07/990,216¹

ON BRIEF

Before SOFOCLEOUS, CAROFF and WEIFFENBACH, Administrative Patent Judges.

CAROFF, Administrative Patent Judge.

DECISION ON APPEAL

This decision on appeal relates to the final rejection of claims 1 and 3-12, all the claims remaining in the involved application.

The claims relate to a multi-component catalyst for removing carbon monoxide, hydrocarbons, and especially nitrogen oxides (NO_x) from the exhaust gases of a lean-burn

¹ Application for patent filed December 14, 1992.

internal combustion engine operating under conditions where oxygen is present in excess of the stoichiometric quantity.

Claims 1 and 4, the sole independent claims on appeal, are representative:

1. A multicomponent catalyst for removing carbon monoxide, hydrocarbons, and nitrogen oxides from the exhaust gases of a lean burn internal combustion engine operating with an air-fuel ratio above about 18/1 comprising at least two components, each of said components characterized by being able to reduce nitrogen oxides within a temperature range beginning near the onset of activity for oxidation of the carbon monoxide, hydrocarbons, and hydrogen by oxygen and ending at a higher temperature, said components being disposed in reverse order of their temperature range for nitrogen oxides reduction so that the component which reduces nitrogen oxides at the highest temperature range is exposed first to the exhaust gases and with the component which reduces nitrogen oxides at the lowest temperature range being exposed last to the exhaust gases.

4. A multicomponent catalyst for removing carbon monoxide, hydrocarbons, and nitrogen oxides from the exhaust gases of an internal combustion engine containing oxygen in excess of the stoichiometric quantity needed for complete combustion comprising at least three components exposed in sequence to the exhaust gases;

(a) a first component capable of reducing nitrogen oxides at temperatures above about 475°C and up to about 800°C;

(b) a second component capable of reducing nitrogen oxides at temperatures above about 315°C and up to about 475°C, and

(c) a third component capable of reducing nitrogen oxides to the diatomic elements at temperatures above about 200°C and up to about 425°C.

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The references of record relied upon by the examiner are:

Völker et al. (Völker) 1978	4,118,199	Oct. 03,
Subramanian et al. (Subramanian) 1993	5,179,053	Jan. 12,

The following rejections are before us for consideration:

I. Claims 1 and 3-12 stand rejected under 35 U.S.C. §
112,
first paragraph, for lack of enablement.

II. Claim 1 alone stands rejected under 35 U.S.C. §
102(e) as being anticipated by Subramanian.

III. Claims 1 and 3-12 stand rejected for obviousness
under
35 U.S.C. § 103 in view of Völker.

We shall not sustain any of the aforementioned rejections
for the reasons set forth by appellants in their brief and
reply brief. Accordingly, we reverse each of the rejections
applied by the examiner. We add the following comments for
emphasis:

I. The 35 U.S.C. § 112 Rejection

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The examiner's case for nonenablement is based on an assertion that determination of a NO_x reduction "temperature window" for any particular catalyst would involve undue experimentation in view of the unpredictable nature of catalysts, viz., the activity of each catalyst must be determined empirically. Thus, according to the examiner, the involved specification is enabling only for the particular catalytic components specifically exemplified in the disclosure. We disagree.

As pointed out by appellants, the examiner has not established that undue experimentation would be involved in selecting a particular catalytic component based on evaluation of its temperature dependent activity. A broad assertion of unpredictability, without more, is not dispositive on the question of "undue experimentation." See Ex parte Forman, 230 USPQ 546, 547 (Bd. Pat. App. & Int. 1986).

II. The 35 U.S.C. § 102(e) Rejection

We agree with appellants that Subramanian does not anticipate the multi-component catalyst of claim 1. The examiner does not dispute appellants' assertion that the air-fuel ratio of above about 18/1, as specified in the claim,

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corresponds to an "R" value of about 0.28 or lower. Neither does the examiner refute the assertion that the claimed catalyst components are defined, in part, in terms of their performance when exposed to exhaust gases from engines operating in the lean range where "R" is about 0.28 or lower. We agree with appellants that the exhaust gas characteristics recited in the claim preamble here must be given weight as a basis for defining the subject catalyst in terms of its performance under certain conditions in order to give life and meaning to the remaining descriptive portions of the claim. The examiner does not allege otherwise. In this regard, see Kropa v. Robie, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951); In re Van Lint, 354 F.2d 674, 680, 148 USPQ 285, 289 (CCPA 1966); and Corning Glass Works v. Sumitomo Electric U.S.A., Inc., 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989).

In view of the foregoing, we agree completely with appellants that Subramanian Figures 2 and 3 demonstrate that the catalysts of the reference do not appear to have the temperature dependent performance characteristics for NO_x reduction required by claim 1 at R values at or below 0.28.

The significance of Figures 2 and 3 of the reference is explained in detail in the brief and reply brief. Appellants' explanation is persuasive and not contradicted by the examiner.

III. The 35 U.S.C. § 103 Rejection

Analysis of the teachings in Völker reveals several flaws in the examiner's position in regard to the question of obviousness. As pointed out by appellants, Völker is not explicitly concerned with NO_x reduction under any particular conditions of the exhaust gas, let alone under lean exhaust conditions. Additionally, Völker neither teaches nor suggests that the active catalyst components be selected on the basis of their characteristic NO_x reduction temperatures. Rather, in Völker arrangement and choice of catalyst is based exclusively on the concentration gradient of the active catalyst component in the direction of flow of the exhaust gas. In short, Völker is not concerned with the problem of how to obtain effective reduction of NO_x over a wide range of exhaust temperatures under lean exhaust conditions, the underlying problem addressed by the instant claims. Moreover, the examiner has not explained why the selection of catalyst

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components based on their temperature-dependent NO_x reduction characteristics would have been obvious or inherent from the teachings of Völker. In this regard, we note that the active catalyst in Völker may be chosen from a wide variety of substances (Völker: column 2, lines 28-30); and the individual catalyst components or monoliths of Völker may even include the same catalytically active substance (Völker: column 3, lines 13-15). Under these circumstances, the individual monoliths would differ only so far as the concentration of active substance differs in each.

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For the foregoing reasons, the decision of the examiner
is reversed.

REVERSED

MICHAEL SOFOCLEOUS)	
Administrative Patent Judge)	
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)	
)	
)	BOARD OF PATENT
MARC L. CAROFF)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
)	
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APJ CAROFF

APJ WEIFFENBACH

APJ SOFOCLEOUS

DECISION: REVERSED

Typed By: Jenine Gillis

DRAFT TYPED: 22 Dec 97

Revision: 23 Dec 97

FINAL TYPED: